

REMARKS

Status of the claims

Claims 12 and 20 were objected to as allegedly being improper. In addition, claims 11-13 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Morii (U.S. Patent Application Publication No. 2008/0036944) in view of Okabe et al. (U.S. Patent No. 6,280,799) (hereinafter “Okabe”).

Amendments to the claims

Claims 12 and 20 are canceled.

No new matter is added by this amendment, and Applicant respectfully submits that entry of the present Amendment is proper.

Response to claim objections

Claims 12 and 20 were objected to as allegedly being improper. Applicant notes that these claims have been canceled, and therefore respectfully submits that this claim objection has been rendered moot. Applicant respectfully requests the withdrawal of this claim objection.

Response to rejection under 35 U.S.C. § 103 based on Morii in view of Okabe

Claims 11-13 and 20 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Morii in view of Okabe. Applicant respectfully submits that the presently claimed invention is not obvious over the teachings of Morii in view of Okabe at least because of the unexpected results of the presently claimed invention.

Independent claim 11 recites a dispersion of spacer particles. The dispersion of spacer particles comprises spacer particles in which a vinyl-based thermoplastic resin, formed by free radical polymerizing a mixture of vinyl-based monomers comprising a vinyl-based monomer having a hydrophilic functional group in an amount of 30 to 80% by weight and a vinyl-based monomer having an alkyl group having 3 to 22 carbon atoms in an amount of 20 to 60% by weight, is combined with the surface of an inorganic fine particle and/or an organic fine particle by graft polymerization. The dispersion of spacer particles further includes a medium comprising water and/or a hydrophilic organic solvent and having the surface tension of 25 to 50 mN/m at 20°C. The spacer particles are dispersed in the form of individual particles in the medium.

Applicant has found that when the content of the vinyl-based monomer having the hydrophilic functional group in the vinyl-based monomer is less than 30% by weight, it becomes difficult to sufficiently disperse the obtained spacer particles as single particles in a dispersion medium. A further problem is that when the vinyl-based monomer above is present in this amount, cohesion spacers form, which makes (1) the stable ejection in an ink-jet system or (2) the formation of an accurate cell gap difficult. Conversely, when the above vinyl-based monomer content is more than 80% by weight, an abnormal orientation of liquid crystal may occur on the surface of a spacer which has overrun into display pixels in forming a cell of a liquid crystal display. This leads to a reduction in display quality.

In addition, Applicant has found that when the content of the vinyl-based monomer having the above alkyl group having 3 to 22 carbon atoms in the vinyl-based monomer is less than 20% by weight, an abnormal orientation of liquid crystal may occur on the surface of a spacer which has overrun into display pixels in forming a cell of a liquid crystal display. This

also leads to a reduction in display quality. On the other hand, when it is more than 60% by weight, the stability of the dispersion of the resulting spacer particles may be reduced.

To this end, Applicant submits a Declaration Under 37 C.F.R. § 1.132 by Mr. Michihisa Ueda showing the unexpectedly superior results of the presently claimed invention. Table 2 of the Declaration shows that when the mixture of vinyl-based monomers contains a vinyl-based monomer having a hydrophilic functional group in an amount of 30 to 80% by weight and a vinyl-based monomer having an alkyl group having 3 to 22 carbon atoms in an amount of 20 to 60% by weight (see Experimental Examples 2, 4, 5, and 6), the “dispersibility,” the “property of location spacer particles,” the “display quality of liquid crystal display cell,” and the “purity of the liquid crystal” properties are all excellent.

Conversely, Table 2 also shows that when the content of the vinyl-based monomer having the above hydrophilic functional group in the vinyl-based monomer is 20% by weight (Experimental Example 1), it becomes difficult to disperse the spacer particle in the medium. In addition, when the content of the vinyl-based monomer having the above hydrophilic functional group in the vinyl-based monomer is 90% by weight (Experimental Example 7), the display quality of the liquid crystal display cell worsened. Experimental Example 3 further shows that when the content of the vinyl-based monomer having the above alkyl group having 3 to 22 carbon atoms in the vinyl-based monomer is 70% by weight, the “dispersibility” worsened, as well.

Accordingly, in view of the Declaration by Mr. Ueda, Applicant respectfully submits that the presently claimed invention is not rendered obvious by Morii in view of Okabe. The position in the Office Action was that Morii discloses a dispersion of spacer particles, which comprises spacer particles in which a vinyl-based thermoplastic resin, formed by free radical polymerizing

a mixture of vinyl-based monomers comprising a vinyl-based monomer having a hydrophilic functional group in an amount of 0 to 100% by weight and a vinyl-based monomer having a alkyl group in an amount of 0 to 100% by weight is combined with the surface of a fine particle by graft polymerization. However, the Office Action also correctly acknowledges that Morii does not expressly disclose the presently recited amounts of vinyl-based monomer having a hydrophilic functional group and vinyl-based monomer having an alkyl group having 3 to 22 carbon atoms. It is therefore not surprising that Morii does not disclose or suggest the advantages caused by such a selection, which are shown in Mr. Ueda's Declaration.

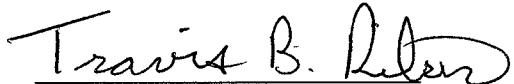
In view of the above, Applicant respectfully submits that the presently claimed invention is not rendered obvious by Morii in view of Okabe. Applicant accordingly respectfully requests the reconsideration and withdrawal of this § 103 rejection.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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